Ephemeris for Physical Observations of Mars, 1894. By A. Marth.

Greenwich Noon. 1894.		Position Angle of ♂'s Axis.	Areographical Longit. of Centre of Disc.	Areographical Latit. of Centre of Disc.	Apparent Diameter.	q	Q	E	Brightness in Star Mag. I.	Brightness in Star Mag. II.
		°	°	°	″	″	°	°		
May	31	341·89	307·68	−23·64	8·82	1·35	246·97	46·05	−0·25	0·25
June	2	341·12	288·01	23·70	8·93	1·37	·87	46·18	−0·28	0·22
	4	340·36	268·34	23·74	9·04	1·40	·78	46·30	−0·31	0·20
	6	339·62	248·68	23·77	9·15	1·42	·71	46·41	−0·34	0·17
	8	338·89	229·02	23·79	9·27	1·45	·65	46·51	−0·37	0·14
	10	338·17	209·37	−23·79	9·39	1·47	246·60	46·60	−0·39	0·11
	12	337·47	189·73	23·77	9·51	1·49	·57	46·69	−0·42	0·08
	14	336·78	170·10	23·74	9·63	1·51	·55	46·77	−0·45	0·06
	16	336·11	150·47	23·69	9·76	1·54	·54	46·83	−0·48	0·03
	18	345·45	130·86	23·63	9·89	1·56	·54	46·89	−0·51	0·00
	20	334·81	111·25	−23·56	10·02	1·59	246·56	46·94	−0·54	−0·03
	22	334·19	91·65	23·47	10·15	1·61	·59	46·97	−0·57	−0·06
	24	333·59	72·07	23·37	10·28	1·64	·63	47·00	−0·60	−0·09
	26	333·00	52·50	23·26	10·42	1·66	·68	47·01	−0·63	−0·12
	28	332·43	32·95	23·13	10·56	1·68	·75	47·02	−0·66	−0·15
	30	331·83	13·41	−22·99	10·71	1·70	246·83	47·01	−0·69	−0·18
July	2	331·35	353·88	22·85	10·86	1·73	246·92	46·98	−0·72	−0·21
	4	330·83	334·37	22·69	11·01	1·75	247·02	46·95	−0·76	−0·25
	6	330·33	314·88	22·52	11·16	1·77	247·13	46·90	−0·79	−0·28
	8	329·86	295·40	22·34	11·32	1·79	247·25	46·84	−0·82	−0·31
	10	329·40	275·94	−22·16	11·48	1·81	247·38	46·76	−0·85	−0·34
	12	328·96	256·50	21·96	11·65	1·83	247·52	46·66	−0·88	−0·38
	14	328·54	237·09	21·75	11·82	1·85	247·67	46·55	−0·92	−0·41
	16	328·14	217·69	21·54	11·99	1·86	247·82	46·42	−0·95	−0·44
	18	327·76	198·31	21·33	12·16	1·88	247·99	46·28	−0·98	−0·48
	20	327·40	178·96	−21·11	12·34	1·89	248·17	46·12	−1·02	−0·51
	22	327·05	159·63	20·88	12·53	1·91	248·35	45·94	−1·05	−0·55
	24	326·73	140·32	20·64	12·72	1·92	248·54	45·74	−1·08	−0·58
	26	326·42	121·04	20·41	12·91	1·93	248·74	45·52	−1·12	−0·62
	28	326·13	101·78	20·17	13·11	1·94	248·94	45·28	−1·15	−0·66
	30	325·86	82·55	−19·93	13·31	1·95	249·15	45·01	−1·19	−0·69
Aug.	1	325·60	63·35	19·69	13·52	1·96	249·37	44·72	−1·23	−0·73
	3	325·36	44·18	19·45	13·73	1·96	249·59	44·41	−1·26	−0·77
	5	325·14	25·04	19·21	13·95	1·96	249·81	44·07	−1·30	−0·81

Greenwich Noon. 1894.		Position Angle of ♂'s Axis.	Areographical Longit. of Centre of Disc.	Areographical Latit. of Centre of Disc.	Apparent Diameter.	q	Q	E	Brightness in Star Mag. I.	Brightness in Star Mag. II.
		°	°	°	″	″	°	°		
Aug.	7	324·93	5·93	18·98	14·17	1·96	250·04	43·70	−1·33	−0·85
	9	324·74	346·85	−18·75	14·40	1·96	250·27	43·30	−1·37	−0·89
	11	324·57	327·81	18·52	14·63	1·95	250·51	42·87	−1·41	−0·93
	13	324·41	308·80	18·30	14·87	1·95	250·75	42·42	−1·45	−0·97
	15	324·26	289·82	18·08	15·11	1·94	250·99	41·93	−1·48	−1·01
	17	324·12	270·88	17·87	15·36	1·92	251·23	41·41	−1·52	−1·05
	19	324·00	251·98	−17·66	15·61	1·90	251·47	40·85	−1·56	−1·09
	21	323·89	233·12	17·47	15·87	1·88	251·71	40·26	−1·60	−1·14
	23	·79	214·30	17·29	16·13	1·85	251·95	39·63	−1·64	−1·18
	25	·70	195·52	17·12	16·40	1·82	252·19	38·96	−1·68	−1·23
	27	·62	176·78	16·96	16·67	1·79	252·43	38·25	−1·72	−1·27
	29	323·55	158·09	−16·81	16·95	1·75	252·67	37·49	−1·76	−1·32
	31	·49	139·45	16·68	17·23	1·71	252·91	36·68	−1·79	−1·36
Sept.	2	·44	120·86	16·57	17·51	1·66	253·15	35·83	−1·83	−1·41
	4	·39	102·32	16·47	17·79	1·60	253·38	34·93	−1·87	−1·46
	6	·35	83·83	16·40	18·08	1·54	253·61	33·98	−1·91	−1·50
	8	323·32	65·38	−16·34	18·37	1·48	253·84	32·98	−1·95	−1·55
	10	·30	46·99	16·30	18·65	1·41	254·08	31·93	−1·99	−1·60
	12	·28	28·65	16·28	18·93	1·34	254·31	30·83	−2·02	−1·64
	14	·27	10·37	16·28	19·21	1·26	254·54	29·67	−2·06	−1·69
	16	·26	352·15	16·30	19·48	1·18	254·78	28·45	−2·09	−1·74
	18	323·26	333·98	−16·35	19·75	1·09	255·02	27·18	−2·13	−1·78
	20	·27	315·86	16·42	20·01	1·00	255·27	25·85	−2·16	−1·83
	22	·28	297·80	16·51	20·26	0·91	258·54	24·47	−2·19	−1·87
	24	·30	279·80	16·63	20·50	0·82	255·83	23·03	−2·22	−1·92
	26	·32	261·86	16·77	20·72	0·72	256·14	21·53	−2·24	−1·96
	28	323·36	243·97	−16·93	20·93	0·63	256·50	19·98	−2·27	−2·00
	30	·40	226·13	17·11	21·12	0·54	256·91	18·38	−2·29	−2·04
Oct.	2	·45	208·33	17·31	21·28	0·45	257·40	16·74	−2·31	−2·08
	4	·51	190·58	17·53	21·42	0·37	258·00	15·05	−2·32	−2·12
	6	·57	172·88	17·76	21·53	0·29	258·74	13·33	−2·34	−2·15
	8	323·64	155·21	−18·01	21·62	0·22	259·73	11·58	−2·35	−2·18
	10	323·72	137·57	18·28	21·67	0·16	261·10	9·80	−2·35	−2·21
	12	323·81	119·95	18·55	21·70	0·11	263·10	8·00	−2·35	−2·23
	14	323·91	102·36	18·83	21·69	0·06	266·3	6·21	−2·35	−2·26
	16	324·02	84·78	19·12	21·65	0·03	272·1	4·44	−2·35	−2·28
	18	324·13	67·20	−19·41	21·58	0·013	285·3	2·78	−2·34	−2·30

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1894.	°	°	°	″	″	°	°		
Oct. 20	324·24	49·63	−19·70	21 47	0·004	324·8	1·60	−2·32	−2·30
22	324·36	32·05	19·99	21·33	0·009	23·8	2·05	−2·31	−2·28
24	324·48	14·46	20 28	21·16	0·02	46·3	3·54	−2·29	−2·23
26	324·61	356·85	20 56	20 97	0·04	54·8	5·23	−2·26	−2·19
28	324·73	339·21	−20·83	20·74	0·08	59 02	6·94	−2·23	−2·14
30	324·85	321·54	21·10	20·49	0·12	61·50	8·65	−2·20	−2·08
Nov. 1	324·96	303 84	21·36	20·22	0·16	63·12	10·33	−2·17	−2 02
3	325·06	286·09	21·60	19·92	0·22	64·24	11·97	−2·13	−1·96
5	325·16	268·30	21·83	19·61	0·27	65·07	13·61	−2·09	−1 90
7	325·25	250·46	−22·04	19·29	0 33	65 68	15·11	−2·04	−1·84
9	325·33	232·56	22·24	18·95	0·39	66·17	16·60	−2·00	−1·77
11	325·39	214·61	22·42	18·60	0·46	66·55	18·04	−1·95	−1·71
13	325·44	196·60	22·59	18·25	0·52	66 86	19·42	−1·90	−1 64
15	325·48	178·54	22·75	17 89	0·58	67·12	20·75	−1·85	−1·58
17	325·50	160·42	−22·89	17·53	0·64	67·34	22·02	−1·80	−1 51
19	325·51	142·25	23·01	17·16	0·70	67·52	23·23	−1·74	−1·44
21	325·50	124·02	23·11	16·80	0·75	67·68	24·39	−1·69	−1·37
23	325·48	105 73	23·20	16·44	0·80	67·82	25·49	−1·63	−1·31
25	325·44	87·38	23 28	16·08	0·85	67·94	26·53	−1·57	−1·24
27	325·39	68·98	−23·34	15·72	0·89	68·05	27·52	−1·52	−1·17
29	325·33	50·53	23·39	15·37	0·93	68·15	28·45	−1·46	−1·11
Dec. 1	325·25	32·03	23·42	15·03	0·96	68·25	29·33	−1·40	−1·04
3	325·17	13·47	23·43	14·69	0·99	68·34	30·16	−1·35	−0·97
5	325·07	354·87	23·43	14·36	1·02	68·43	30·94	−1·29	−0·91
7	324·96	336·22	−23·42	14·04	1·05	68·52	31·17	−1·23	−0·84
9	324·84	317·52	23·39	13 72	1·07	68·61	32·36	−1·17	−0·78
11	324·71	298·79	23·35	13 42	1 09	68·69	33·01	−1·12	−0·72
13	324·58	280 02	23·30	13·12	1·10	68·78	33·61	−1·06	−0·66
15	324·44	261·21	23·23	12·83	1·11	68·87	34·17	−1·01	−0·60
17	324·29	242 36	−23·15	12·54	1·12	68·96	34·70	−0·95	−0·54
19	324·14	223·48	23·05	12·27	1·12	69·05	35·19	−0·90	−0·48
21	323·99	204·56	22·94	12·00	1·12	69·15	35 64	−0·84	−0·42
23	323·84	185·62	22·82	11·75	1·12	69·25	36·06	−0 79	−0·36
25	323·68	166·65	22·69	11·50	1·12	69·36	36·44	−0·74	−0 31
27	323·53	147·65	−22·54	11·25	1·12	69·48	36·79	−0·68	−0 25
29	323·38	128·63	22·38	11·02	1·12	69·60	37·12	−0·63	−0·20
31	323·23	109·58	22·21	10·79	1·11	69·73	37·41	−0·58	−0·14

Greenwich Noon.	Position Angle of ♂'s Axis.	Areographical Longit. of Centre of Disc.	Areographical Latit. of Centre of Disc.	Apparent Diameter.	q	Q	E	Brightness in Star Mag. I.	Brightness in Star Mag. II.
1895.	°	°	°	″	″	°	°		
Jan. 2	323·08	90·51	−22·03	10·57	1·10	69·86	37·68	−0·53	−0·09
4	322·94	71·42	21·83	10·36	1·09	69·99	37·93	−0·48	−0·04
6	322·80	52·31	−21·62	10·15	1·08	70·14	38·15	−0·43	0·01
8	322·67	33·18	21·40	9·95	1·07	70·30	38·34	−0·38	0·06
10	322·54	14·03	21·17	9·75	1·06	70·46	38·51	−0·34	0·11
12	322·42	354·87	20·93	9·57	1·05	70·63	38·66	−0·29	0·16
14	322·31	335·70	20·67	9·39	1·03	70·80	38 79	−0·24	0·21
16	322·21	316·51	−20·41	9·21	1·02	70·99	38·90	−0·20	0·25
18	322·12	297·31	20·13	9·04	1·01	71·18	38·99	−0·15	0·30
20	322·04	278·10	19·84	8·87	0·99	71·38	39·06	−0·11	0·34
22	321·97	258·88	19·55	8·71	0·98	71·59	39·12	−0·07	0·39
24	321·91	239·65	19·24	8 56	0·96	71·81	39·16	−0·02	0·43
26	321·86	220·41	−18·92	8·41	0·95	72·04	39·18	0 02	0·47
28	321·83	201·16	18·59	8·26	0·93	72·28	39·19	0·06	0·51
30	321·81	181·91	18·25	8·12	0·91	72·52	39·18	0·10	0·55
Feb. 1	321·80	162·65	17·90	7·99	0·90	72·78	39·16	0·14	0·59
3	321·80	143·38	17·55	7·86	0·88	73·04	39·13	0·18	0·63
5	321·82	124 11	−17·18	7·73	0·86	73·31	39·08	0·22	0·67
7	321·86	104·83	16·80	7·60	0·85	73·59	39·02	0·26	0·71
9	321·91	85·55	16·42	7·48	0·83	73·88	38·95	0·29	0·74
11	321·97	66·26	16·03	7·37	0·82	74·18	38·87	0·33	0·78
13	322·05	46·97	15·63	7·25	0·80	74·49	38·78	0·37	0·82
15	322·14	27·68	−15·22	7·14	0·78	74·81	38·67	0·40	0·85

1894 April 7·3. Autumn equinox of ♂'s northern hemisphere.
1894 August 31·3. Winter solstice ,, ,, ,,
1895 February 7·3. Spring equinox ,, ,, ,,

Q denotes the position angle, and q the amount of the greatest defect of illumination, E (as in preceding ephemerides) the phase-angle or the areocentric angle between Earth and Sun.

The last column gives the brightness of *Mars* expressed in star magnitudes, the brightness at mean opposition being assumed to be $-1^{m}\cdot787$, according to Prof. G. Müller's determination (in vol. viii. of the *Publicationen des Astrophysikalischen Observatoriums zu Potsdam*), and the diminution of brightness due to the phase being computed on two suppositions—(I) that it depends simply on the proportion of the unilluminated portion to the whole of the disc, so that the alteration of magnitude amounts to $+5$ log sec $\frac{1}{2}$ E; or (II) that the alteration is repre-

sented by Müller's empirical formula $+0^{\circ}.01426\ \alpha$, in which the phase angle α (here E) is expressed in degrees.

The data of the ephemeris are to be interpolated directly for the times for which they are required, since the equation of light has already been taken into account. The differences between successive values of the areographical longitudes of the centre vary from $700^{\circ}.33$ to $702^{\circ}.43$.

The adopted zero meridian will pass the centre of the disc at the following Greenwich mean times:—

1894.	h	m	1894.	h	m	1894.	h	m
May 31	3	35·2	July 2	0	25·1	Aug. 2	20	58·4
June 1	4	15·6	3	1	5·3	3	21	37·8
2	4	56·1	4	1	45·4	4	22	17·1
3	5	36·5	5	2	25·4	5	22	56·4
4	6	16·9	6	3	5·5	6	23	25 6
5	6	57·4	7	3	45·6	8	0	14·8
6	7	37·8	8	4	25·6	9	0	54·0
7	8	18·2	9	5	5·6	10	1	33·2
8	8	58·6	10	5	45·6	11	2	12·3
9	9	39·0	11	6	25·5	12	2	51·3
10	10	19·4	12	7	5·5	13	3	30·3
11	10	59·8	13	7	45·4	14	4	9·3
12	11	40·2	14	8	25·3	15	4	48·3
13	12	20 5	15	9	5·1	16	5	27·2
14	13	0·9	16	9	45·0	17	6	6·1
15	13	41·2	17	10	24·8	18	6	44·9
16	14	21·6	18	11	4 6	19	7	13·7
17	15	1·9	19	11	44·4	20	8	2·5
18	15	42·2	20	12	24·1	21	8	41·2
19	16	22·5	21	13	3·9	22	9	19·8
20	17	2·9	22	13	43·6	23	9	58·4
21	17	43·1	23	14	23·3	24	10	37·0
22	18	23·4	24	15	2·9	25	11	15·5
23	19	3·7	25	15	42·5	26	11	54·0
24	19	43·9	26	16	22·1	27	12	32·4
25	20	24·1	27	17	1·7	28	13	10·8
26	21	4·3	28	17	41·2	29	13	49·1
27	21	44·5	29	18	20·7	30	14	27·4
28	22	24·7	30	19	0·2	31	15	5·6
29	23	4·9	31	19	39·7	Sept. 1	15	43·8
30	23	45·0	Aug. 1	20	19·1	2	16	21·9

1894.	h	m
Sept. 3	16	59·9
4	17	37·9
5	18	15·9
6	18	53·8
7	19	31·6
8	20	9·4
9	20	47·1
10	21	24·8
11	22	2·4
12	22	39·9
13	23	17·4
14	23	54·8
16	0	32·2
17	1	9·5
18	1	46·8
19	2	24·0
20	3	1·1
21	3	38·2
22	4	15·2
23	4	52·1
24	5	29·0
25	6	5·8
26	6	42·6
27	7	19·3
28	7	55·9
29	8	32·5
30	9	9·1
Oct. 1	9	45·6
2	10	22·0
3	10	58·4
4	11	34·8
5	12	11·1
6	12	47·3
7	13	23·8
8	13	59·7
9	14	35·9
10	15	12·0
11	15	48·1
12	16	24·2

1894.	h	m
Oct. 13	17	0·3
14	17	36·4
15	18	12·4
16	18	48·4
17	19	24·5
18	20	0·5
19	20	36·5
20	21	12·5
21	21	48·6
22	22	24·6
23	23	0·7
24	23	36·8
26	0	12·9
27	0	49·1
28	1	25·3
29	2	1·5
30	2	37·7
31	3	14·0
Nov. 1	3	50·3
2	4	26·7
3	5	3·1
4	5	39·6
5	6	16·1
6	6	52·7
7	7	29·3
8	8	6·0
9	8	42·8
10	9	19·6
11	9	46·5
12	10	33·4
13	11	10·4
14	11	47·4
15	12	24·5
16	13	1·7
17	13	38·9
18	14	16·2
19	14	53·6
20	15	31·0
21	16	8·5

1894.	h	m
Nov. 22	16	46·0
23	17	23·6
24	18	1·3
25	18	39·0
26	19	16·8
27	19	54·7
28	20	32·6
29	21	10·5
30	21	48·5
Dec. 1	22	26·6
2	23	4·7
3	23	42·9
5	0	21·1
6	0	59·3
7	1	37·6
8	2	16·0
9	2	54·4
10	3	32·9
11	4	11·4
12	4	49·9
13	5	28·5
14	6	7·1
15	6	45·8
16	7	24·5
17	8	3·2
18	8	42·0
19	9	20·8
20	9	59·7
21	10	38·6
22	11	17·5
23	11	56·4
24	12	35·4
25	13	14·4
26	13	53·4
27	14	32·4
28	15	11·5
29	15	50·6
30	16	29·7
31	17	8·9

1895.	h	m	1895.	h	m	1895.	h	m
Jan. 1	17	48·1	Jan. 17	3	38·2	Feb. 1	13	31·1
2	18	27·3	18	4	17·6	2	14	10·7
3	19	6·5	19	4	57·1	3	14	50·3
4	19	45·8	20	5	36·6	4	15	29·9
5	20	25·1	21	6	16·1	5	16	9·5
6	21	4·4	22	6	55·6	6	16	49·1
7	21	43·7	23	7	35·1	7	17	28·8
8	22	23·0	24	8	14·6	8	18	8·4
9	23	2·3	25	8	54·1	9	18	48·0
10	23	41·7	26	9	33·7	10	19	27·7
12	0	21·1	27	10	13·2	11	20	7·3
13	1	0·5	28	10	52·8	12	20	46·9
14	1	39·9	29	11	32·4	13	21	26·6
15	2	19·3	30	12	11·9	14	22	6·2
16	2	58·7	31	12	51·5			

The present ephemeris is founded upon the same elements as those for the preceding oppositions, as this year's observations will probably yield such effective contributions towards a closer determination of the position of the planet's axis, and of the leading points of areography, that it would be premature to make any alterations till the results of the observations are known. In this respect it is specially desirable to get good places of Schiaparelli's *Sinus Titanum*, since those obtained in 1879 are not sufficiently accordant, and also good places of the *Fastigium Aryn* and of the region near. The *Sinus Titanum* will pass the central meridian near the centre of the disc, about $11^h 6$ after the passage of the zero meridian.

As Schröter's sketches Nos. 25 and 26* were made just a hundred years ago, in 1794, the present occasion seems not unsuitable for pointing out, in fairness to them, that they represent, however imperfectly, the region of the Kaiser Sea or Syrtis, or Mer de Sablier. The reason why there has been any difficulty in their interpretation is to be found in a simple slip in writing or mistake in reading. The two sketches were made in the month of May, not März, or March, 1794. This is indicated already by the aspect of the unilluminated portions of the discs, which are shown to be on the following (not the preceding) side, and somewhat less than in the next sketch, dated June 1. Moreover, Schröter expressly states that the time of No. 25 was $30\frac{1}{2}$ days after the opposition, which occurred on the morning of April 24, so that *after* gives the evening of May 24, while *before* would give the printed date. But at the given hour of March 24 *Mars* was not yet above the horizon.

* J. H. Schröter, *Areographische Beiträge*, herausgegeben von Van de Sande Bakhuyzen, 1881, and also C. Flammarion, *La Planète Mars*, 1892, p. 72.